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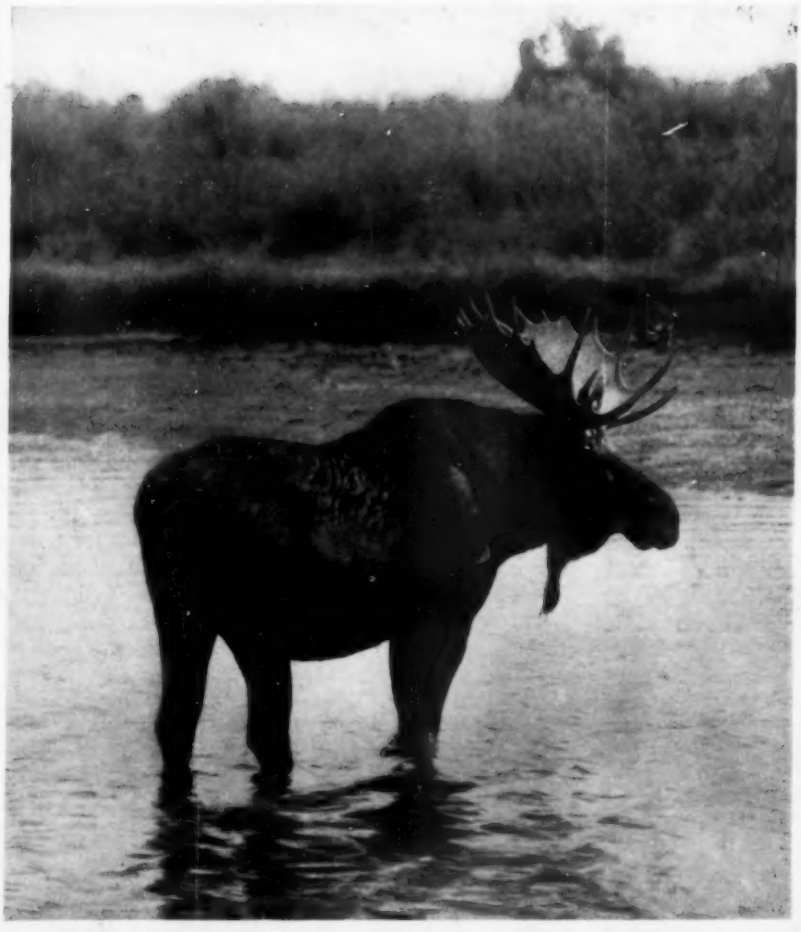
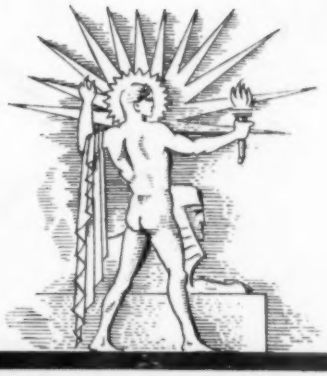
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





August 27, 1938

Substantial Specter

See Page 143

A SCIENCE SERVICE PUBLICATION

Do You Know?

Some gazelles are far from gentle.

The bumpers of automobiles cause some of the commonest and most serious fractures of the lower leg.

To bring medical aid to settlers in remote regions, Australia has had a Flying Doctor Service since 1928.

It may be good farming to leave hedges and fence rows untidy, because game birds choose the growth as shelter for nests.

A blue moon is sometimes seen when haze, smoke or some other atmospheric condition shows the moon in a blue light.

From a recent survey, it is believed that deafness in older people is due more often to infection than was formerly supposed.

The speed of a boxer's punch can now be measured by a laboratory device, and one 195-pound boxer's swing was timed at 40 miles per hour.

Blue staining of lumber during seasoning used to cause large losses to the lumber industry, but now chemicals prevent much of this loss.

Efforts to Americanize architectural columns produced a corn capital designed for the Capitol Building at Washington, and a tobacco capital for Jefferson's home at Monticello.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ARCHAEOLOGY

Where are "the houses of the dead"? p. 131.

ASTRONOMY

How bright is the brightest stellar object ever observed? p. 136.
What is Zeta Aurigae? p. 138.
When can you see Mercury? p. 140.

BACTERIOLOGY

Can toothpastes kill all the germs in your mouth? p. 141.

BIOCHEMISTRY

How can yeast help make meat? p. 137.

BOTANY

What is the study value of fruits and seeds? p. 143.

CHEMISTRY

What advantages are claimed for the new American casein "wool"? p. 133.

ETHNOLOGY

What did the Sioux mean when they said "Cheyenne!"? p. 137.

EVOLUTION

Where are cecropia moths found? p. 133.

FORESTRY

What is wrong with the method of buying pulp-wood in the South? p. 142.

GARDENING

Where is camomile used for lawns? p. 137.

GEOLOGY

How close to the Mississippi is the nearest oil well in its valley? p. 136.

Why can't the "footprints" at Bath, N. C., be filled? p. 142.

PALEONTOLOGY

How large is the biggest creodont skull? p. 137.

Were ancient whales very large? p. 139.

PHYSICS

At what altitude is cosmic-ray hunting good? p. 131.

What are excitons and phonons? p. 136.

Why can't you see a man walking on a highway at night? p. 138.

What is a radium hound? p. 142.

PLANT PHYSIOLOGY

Why do aquatic plants have internal air passages? p. 136.

PSYCHOLOGY

Why do suckers fall for swindlers? p. 139.

PUBLIC HEALTH

What proportion of ships are now rat-infested? p. 134.

RADIO

What advantage do ultra-short radio waves offer aviation? p. 136.

SCIENCE

Is there hope that science may influence the course of statesmanship? p. 132.

Automobile manufacturers find that bright colored automobiles are more favored in warm sections of the country than in cold regions.

A new idea in carrying perishable fruits and vegetables to markets in the North was carried out in Knoxville, Tenn., recently with the launching of a floating refrigerated warehouse.

The record for length in the plant world is held by the rattan palm, a vine which may exceed 970 feet in length.

In making thread for silk stockings, the filaments from about ten cocoons are twisted together to make two-thread weight; and for a four-thread stocking about twenty cocoons are twisted into thread.

SCIENCE NEWS LETTER

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PHYSICS

Heavy Electrons Originate High in Upper Atmosphere

Flight Into Sub-Stratosphere Enables Scientists To Study Penetrating Components of Cosmic Rays

DATA gathered by two University of Chicago scientists in an airplane flight into the substratosphere indicate that the mysterious heavy-electron cosmic rays originate in the upper atmosphere of the earth.

This was the first time such measurements were made in an airplane at high altitude. This flight, on July 30, bids fair to make scientific history.

One of science's newest subatomic building blocks, the heavy electron, identified as the penetrating part of the cosmic ray, originates through the impact of photons on the cores of atoms high in the atmosphere, Dr. Marcel Schein of the University told Science Service.

Not Much Doubt

Although Dr. Schein and his colleague, Dr. Volney C. Wilson, are, in keeping with the best scientific practice, not completely certain that this is so, evidence they gathered in a giant transport plane 25,000 feet over Chicago is so strong as to leave not much room for doubt, he declared.

A report on their experiment, in which they carried cosmic ray recording equipment aloft and during which they spent at least 90 minutes at an altitude of 25,000 feet, appears in the *Physical Review* (Aug. 15).

Four Geiger-Mueller counters and a sheet of lead 2.2 centimeters thick gave the evidence for which the two scientists were looking.

Cosmic rays include both a penetrating, ionizing component and a "soft" component. The University of Chicago scientists wished to check on the occurrence of the penetrating rays in the upper atmosphere, feeling that such a check might give them a clue to their formation. It did.

Setting their four Geiger-Mueller tubes in such a position that penetrating rays coming vertically downward through all four were the only ones that registered, Dr. Schein and Dr. Wilson placed the sheet of lead so that it gave them a direct clue.

When the lead was placed above all four tubes the number of penetrating rays recorded during a three-minute interval at 25,000 feet was more than twice the number recorded under similar conditions when the lead was placed between the second and third tubes. This indicated, Dr. Schein explained, that heavy electrons were being formed in the lead itself, probably through the impact of photons on lead atom nuclei.

This indicates the impact origin of the heavy electron and, since similar occurrences must be taking place in the air, tells the story that heavy electrons are being formed in the atmosphere.

Increasing rarity of the atmosphere, plus the fact that the proportion of these heavy electrons is less as the altitude rises, indicates further that an altitude of maximum heavy electron formation should exist, Dr. Schein also stated.

Hoping to find that maximum, Dr. Schein is already investigating the possibility of further stratosphere flights. Such tests in planes have the advantage over those made in unmanned balloons that more equipment plus such items as the lead plates used in this experiment can be carried, whereas the equipment for unmanned balloons must be made as light as possible.

Science News Letter, August 27, 1938

ARCHAEOLOGY

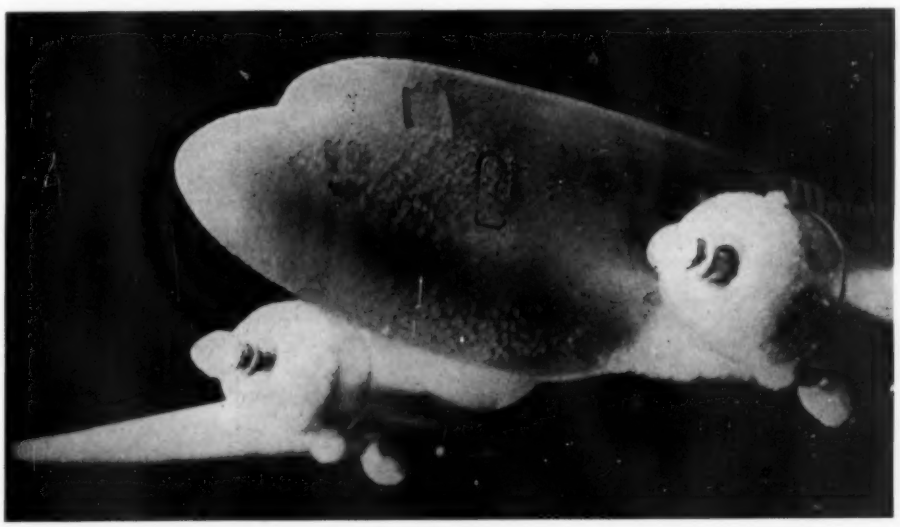
"Houses of Dead" Possible Link With Moundbuilders

SKULLS of eight Indians with curiously arched foreheads have been unearthed in ancient "houses of the dead" near Kansas City by Dr. Waldo R. Wedel of the Smithsonian Institution.

Dr. Wedel says he found the extraordinary skulls, with natural bony ridge from front to back of the head, while he was unearthing low mounds just over the Missouri line. The mounds, less than three feet high, contain partly sunken stone burial chambers. Known as houses of the dead, the mounds have been locally famed for many years, and have been so looted by pothunters that the Smithsonian archaeologist has found few which he could investigate to reconstruct the history of the ridge-headed people.

Scientific interest is aroused in these extraordinary looking Indians because they are believed to be a western link in the story of famous Hopewell Indian Moundbuilders who attained high culture in the Ohio Valley.

Science News Letter, August 27, 1938



PILOT'S NIGHTMARE

Only in the movies or in a pilot's worst dreams could a plane ice up like this one. Tests in the "ice box" wind tunnel at Akron, Ohio, produce severe icing conditions beyond anything experienced in actual flying, so that scientists can test the efficiency of de-icing equipment under all imaginable conditions.

SCIENCE

Science Used, But Not Heeded, Is Plaint of British Leader

Disclaimer of Science's Responsibility for War Registered At Opening of British Association Meeting in Cambridge

LORD Rayleigh, president of the British Association for the Advancement of Science, in his address opening the Association's annual meeting at Cambridge, declared pessimistically, "The world is ready to accept the gifts of science to use for its own purposes, but it is difficult to see any sign that it is ready to accept the advice of scientific men as to what those uses should be."

Disagreement with their leader's pessimism is already being registered, however, by many British scientists, as well as by some of the foreign visitors who attended the meeting. A surprising number of the more optimistic scientists hold that there is a growing movement among leaders, showing solid determination that scientists shall have a say regarding the utilization of the riches they bestow upon civilization. It is probable that scientific liberals will demand more than mere fact-finding roles for themselves and insist that political and economic leaders take scientific advice in running the world.

Not Responsible

Lord Rayleigh challenged the idea that science is responsible for application of its own discoveries to the purposes of war. He pointed out how the Chief of Staff of the British Army in 1908, five years after the successful flights of the Wright brothers, had scorned aviation as of no military value.

Lord Rayleigh declared, "The application of the fundamental discoveries of science to the purposes of war is altogether too remote for it to be possible to control such discoveries at the source."

National hoards for emergency purposes are already showing a tendency to take the form of food reserves rather than gold reserves, it developed in discussion by J. M. Keynes, C. B., of Cambridge University, noted writer on economic questions. As he summed it up:

"It is an outstanding fault of the competitive system that there is not sufficient incentive for the storing of raw materials so as to average periods of high and low demand, except by means of excessive price fluctuations. There is, therefore, a prima facie case for government action to supplement this deficiency, which is not easily supplied by the competitive system from within.

"In present circumstances three considerations combine to reinforce this prima facie case: (1) storage for war purposes; (2) with the object of mitigating the fluctuations of the trade cycle; and (3) the stabilization of prices by holding some part of the central banking reserves, not in gold, but in a composite commodity."

Hot-and-Bothered

First understanding of exactly what happens within the hearts of atoms, showing that they get hot and bothered and finally go smash, poetically like the explosive ending of a love idyll, was presented by the Danish Nobelist Neils Bohr.

When the nucleus or heart of an atom is subjected to bombardment with electrical particles, the events resemble on a small scale what happens when you heat up an ordinary larger object. At first, energy is added and a semi-stable compound nucleus is formed. Then the whole thing either goes to pieces or deactivates itself by radiating away the energy that has been shot into it.

We could learn about cosmic rays much more rapidly if it were not for the unfortunate circumstances that the earth has an atmosphere. A visiting German scientist, Prof. E. Regner of Stuttgart Technical College, told of some of the troubles introduced by the presence of such a lot of air over the earth.

"Unfortunately there are great experimental difficulties in the exact measurement of cosmic rays at great heights," he said. "Neverthless it is firmly established that a transition effect exists at the limit of the atmosphere, which is shown by a detectable maximum in greater heights."

The sun's behavior is another disturbing element, Prof. Regner stated. When Old Sol stirs up a magnetic storm on earth with a burst of unusual activity in his own massive body, there is a corresponding increase of cosmic ray activity at greater altitudes on earth, while at the same time, paradoxically enough, the cosmic ray activity at sea level diminishes.

Amazingly "modern" is the broken skull of an exceedingly early Stone Age man discovered at Swanscombe, associated with extinct elephants and other animals that disappeared from Europe with the passing of the Ice Age. This important fossil was discussed by a group of seven scientists, who tackled the question from all possible angles.

Kin to Ourselves

Although this earliest of Early Britons was an exceedingly crude fellow, so far as his tools and other cultural achievements are concerned, he was not a Neandertaler, or a Heidelberger, or a member of any of the other clumsy, beetle-browed races we have been accustomed to regard as dominating the dawn of the Age of Man on this planet. He was like us, a member of the species *Homo sapiens,* so far as all the evidence now in hand can be interpreted.

Islands played a classic role in the development of the doctrine of evolution. Darwin was impressed with the effects on animals and plants of ages of isolation on the Galapagos; similar phenomena on the smaller islands of the East Indies had a like effect on the mind of Alfred Russell Wallace.

Ecological Isles

But isolation can produce evolutionary effects without any islands, it was pointed out by several speakers. Animal and plant communities can be surrounded with conditions on land that prevent their migration just as surely as though they were marooned in the midst of the sea. For example, a forest may be surrounded by grasslands which many of its species are quite unable to cross, or Alpine species may be isolated if the mountain range is in the midst of a desert. Effects of this kind of isolation, termed "ecological isolation," were discussed by Dr. W. B. Turrill, of the Royal Botanic Gardens at Kew.

An even narrower isolation is possible, when the nature of an organism, or the minute interior structure of its cells, prevent it from interbreeding with species that surround it and are somewhat like it, but not sufficiently so to permit successful mating and reproduction. These types of isolation, known respectively as genetic and chromosomal isolation, were the topics of Dr. C. D.

Darlington of the John Innes Horticultural Institution and Dr. D. G. Catcheside of King's College, London.

Farm mechanization has not proceeded as far in Great Britain as it has in the United States, but Dr. S. J. Wright, deputy director of the Agricultural Engineering Research Institute at Oxford University, sees its coming to the islands without very great misgivings.

"Mechanization is neither a serious menace to our rural amenities nor a royal road to prosperity," he declared. "Most of the changes for which mechanization have been blamed are due to purely economic causes, and in the long run, agriculture can absorb mechanization without prejudice to its own interests. Moreover, under present conditions, only the machine can give the agricultural worker the leisure and amenities which he is entitled to demand."

Science News Letter, August 27, 1938

CHEMISTRY

Government Chemists Make Wool-Like Fiber From Casein

TWO U. S. Department of Agriculture chemists have discovered a method for making a wool-like fiber from casein, a component of skim milk. Somewhat similar to an Italian method by which a wool-like fiber has been made for the last three years, the process is being patented under the public service patent law. Discoverers of the process are Stephen P. Gould and Earl O. Whittier, both of the Bureau of Dairy Industry.

To make the fiber, casein is softened in water and dissolved in caustic alkali. It becomes a thick, sticky mass, which is carefully worked into the proper consistency by aging, addition of modifying agents and dilution. The mass is then forced through multiple spinnerets of the kind used in making rayon. The fibers are separated and hardened in an acid bath containing formaldehyde and modifiers.

Synthetic fiber produced in this manner has a chemical composition almost identical with wool except for a lower sulfur content, it is claimed. The fiber, it is also declared, is faintly yellow in color and resembles washed and carded Merino wool, the finest size marketed.

The casein fiber has the characteristic fine kink of natural wool and may be blended readily with natural wool. It has an advantage over kinky fibers made from plant materials in that it takes wool dyes.

Because the fibers are smooth rather than scaly, the new material cannot be felted. It does not shrink as much as natural wool, it is declared.

Similarity of manufacture to the rayon manufacturing process leads the two chemists to believe that its manufacture can be readily carried out in rayon plants by the substitution of casein for cellulose and of different chemical reagents. The two chemists believe it can be produced for fifty cents a pound, approximately the same price as rayon.

Casein is already used for the manufacture of a wide variety of plastic products, such as billiard balls, and for paper coating. Despite the possibility of expanding the market for casein, which comprises three per cent. of skim milk, Bureau scientists do not believe production of milk for its casein content alone would be profitable.

Science News Letter, August 27, 1938

EVOLUTION

Evolution at Work Seen in Moth Study

EVOLUTION at work in quite recent (geologically speaking) time, and very probably still at work, has been traced with the help of some big moths, by Dr. W. R. Sweadner of the University of Pittsburgh.

Dr. Sweadner's subjects were the common and widely distributed cecropia moths — big, hairy, handsome fellows with crescent-shaped white spots in their wings. Although they all look rather alike to the casual observer, there are enough differences in structure and marking to separate them into eight distinct species, spread clear across North America. Each species has its own territorial range.

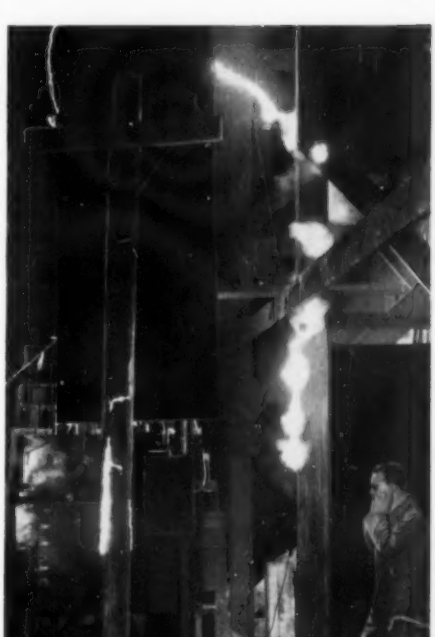
Examination of Ice Age history makes it highly probable that during that revolutionary epoch there were three species of these moths — eastern, central, and western—each kept away from its neighbors' range by natural barriers, which operated not directly on the insects but on the food plants on which they depended.

As the Ice Age drew to its close, the trees and shrubs on which the cecropia caterpillars feed followed the retreating edge of the glaciers northward. Well up in Canada, the range of the plants spread to east and west, and the moths extended their range with them.

This brought the hitherto separated species into contact. Interbreeding occurred, and played a very important part in the development of several additional species. Indeed, one of the species now recognized is considered by Dr. Sweader to be merely a complex of hybrid intergrades between two overlapping older species, and not a distinct group at all.

Dr. Sweader demonstrated the possibility of producing definite new forms by cross-breeding the various species in the laboratory.

Science News Letter, August 27, 1938



TOO CLOSE FOR COMFORT

Artificial lightning on a tantrum missed this engineer by a scant two feet as it broke away from its prescribed path in the Westinghouse high voltage laboratory at Sharon, Pa. It ran down the partition protecting the engineer, only a fraction of the 50,000-ampere, 3,000,000-volt bolt remaining in the transmission pole.

As far back as 1860, photographers recorded an eclipse of the sun.

PUBLIC HEALTH

Death Rides a Rat

Bubonic Plague's Ever-Menacing Invasion Keeps Forces of National and State Public Health Services on the Alert

By JANE STAFFORD

A FIERCE enemy with a new disguise has gained a foothold on California's shores and is crawling east and north, threatening two-thirds of the continent, from Alaska to the Ohio river.

Against this enemy there is a slender line of defenders—a handful of men, with headquarters in San Francisco, who spend most of their time roaming the valleys from California to Montana, catching squirrels and other rodents.

The Enemy Strikes

Last summer the enemy came from its hideout to make a strike. On Aug. 30, 1937, a man in Fresno County, Calif., died—a victim of bubonic plague.

Only two months before, the captain of the squirrel-chasing band of defenders had given public warning of the enemy's presence: Plague was abroad in the land, lurking in the bodies of ground squirrels and other wild rodents. True, it was wearing a disguise, was masked as sylvatic plague. But it was just as dangerous. The summer before, a lad died of bubonic plague three days after burying a pet chipmunk that had mysteriously sickened and died.

This warning was given to a gathering of scientists in Denver. There was some grave head-shaking. Alert newspapermen covering the meeting caught the implications. There were headlines in the afternoon newspapers. Next day there were different headlines—and the captain of the plague fighters, Dr. C. R. Eskey, senior surgeon of the U. S. Public Health Service, went quietly back to his squirrel-chasing under the hot Utah sun.

Two months later the Fresno County man died, a victim of plague. That was the summer of 1937. The summer of 1938 is with us now. In May of this year the U. S. Public Health Service reported plague infection among the ground squirrels in Santa Cruz County, Calif. Is the enemy ready to strike again?

The havoc that follows an extensive outbreak of plague is far worse than that of an invading army. If you recall the disastrous influenza epidemic during the World War and the terror that outbreak aroused, you will have just a faint picture of what a plague epidemic can mean to a country and its people. The plague that swept the world in the middle of the fourteenth century, described as the worst disaster ever experienced by man, is said to have been three times as severe in actual number of people killed as the frightful influenza epidemic of 1918-19.

Plague is caused by microbes or germs called *Pasteurella pestis*. This plague germ lives in the bodies of rats and is transferred to man by fleas that have first fed on the rat. As a nation, we are fortunately not much given to fleas. That helps cut down the chances of our getting plague.

Our federal health men have for decades been alert to detect plague patients coming from foreign countries and to keep them out or isolate them so they could not spread the disease. These same health men—officers of the U. S. Public Health Service—have been equally alert and on the watch for plague-carrying rats at our seaports.

Plague was formerly carried from one country to another by swarms of rats that lived in the holds of ships and came ashore at every port. When the rat's villainous role in the plague situation was learned, wharves were rat-proofed. Ships known to have come from plague-infested ports are fumigated by quarantine officers. Modern ships are being built on rat-proof lines. As recently as 1925, half the ships coming to U. S. ports were rat-infested, but now only one-tenth of them harbor rats, and the number of rats per ship is much smaller than formerly.

So the danger of plague has grown less and less in this country. We read of the horrors of plague in the Orient, where it is still prevalent, with a very comfortable feeling of being far away and safe. We even read of plague on the loose among ground squirrels in our own country—and then a friendly gray squirrel taps on the dining room window for his breakfast. Cunning little fellow. He hasn't the plague, we think scornfully, as we watch him feeding out of our hands.

Twofold Danger

The danger in the present situation is two-fold. One part is the spread of plague among ground squirrels and other wild rodents over a constantly widening area of the country. Plague-infected wild rodents have been found not only in California, where the infection first got its start among them, but also in Nevada, Montana, Idaho, Oregon, Washington

INNOCENT MENACES

California ground squirrels, carrying plague germs in their bodies, constantly menace hunters, ranchers, and vacationists in the West, and by passing their deadly burden on to other rodents they may extend the zone of potential plague to the East as well.

and Utah. This sylvatic plague is probably spread over a much wider area, its existence being unrecognized because no search has been made for it. The possibility of its spreading as far north as Alaska and as far east as the Ohio river is based on the fact that these limits bound the territory in which the particular squirrel roams. Plague has not yet been found in other varieties of squirrels, though they may acquire it from their cousins of the West. Chipmunks and prairie dogs have acquired the infection, and health authorities believe that it is only a matter of time before domestic rats—the kind that are a nuisance around houses and barns and storehouses—will be infected. This will reintroduce plague into our cities and endanger all of us.

Pneumonic Plague

The second part of the danger is that undiagnosed cases of pneumonic plague may start epidemics of this very fatal type of human plague. Dr. Eskey called attention to one such epidemic of 13 cases that occurred in the United States and which could have been prevented if the proper diagnosis had been made in the case of the first patient who became ill a few days after hunting ground squirrels.

Pneumonic plague, which kills in a few days, does not need any flea as transmitting agent. You can get this just as you get a cold from breathing air that a plague patient has infected with the germs expelled in his breath.

Suppose a man is our hunting or trapping and gets bitten by a squirrel, or by a particularly hungry flea from a wild squirrel, or perhaps he handles the carcasses of dead squirrels or other wild rodents. A few days later he gets sick with fever and a cough and difficulty in breathing. He may have pain in his lungs. His spleen gets big. He rapidly turns blue and within four days he dies. That is the picture of pneumonic plague.

Unguessed Danger

This plague victim did not know that the squirrels he handled or the flea that bit him were infected with plague. Even if he had heard that there was plague among ground squirrels, he may have forgotten the flea bite, he may not have thought to tell the doctor that he had been squirrel shooting a few days before he got sick. And the doctor, unless he is extremely alert, is not likely to think, in this day in our country, of plague in a patient with fever and a cough. Even if he did, he probably could not have saved the patient, because pneumonic plague is almost always rapidly fatal.

The great danger, however, is that this patient, whose sickness was not recognized as plague, probably was not isolated, but was sick at home, where relatives and friends visited him and picked up the plague germs he was exhaling with every breath and cough. Some of these persons would get sick and in turn infect still others, before the epidemic would be recognized and steps taken to check it.

Path of Infection

Pneumonic plague, unfortunately, is the kind that is particularly likely to follow ground-squirrel infection. The reason is that whereas rat bites are usually on the legs, squirrel bites are usually on the hand or arm, as a result of handling the animal. The first bubo or swelling in plague from a rat bite comes generally in the inguinal region, but the bubo after the squirrel bite on the arm comes in the armpit whence the plague germs can travel directly to the lungs. The patient then coughs out the germs and anyone in contact with him is likely to get plague pneumonia directly.

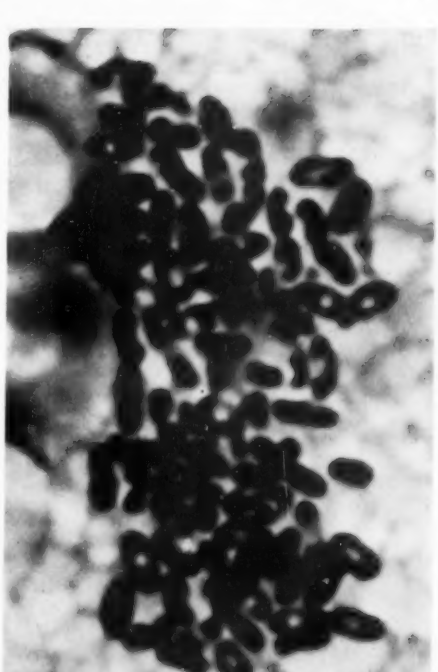
Standing guard between us and this plague danger is the small band of men working with Dr. Eskey at the squirrel-chasing and catching job. Some of these men are part of the U. S. Public Health Service's force of disease fighters, some are special crews from the health departments of California and five other states, and some are recruited from the Bureau of Biological Survey of the U. S. Department of Agriculture.

Simple, But Hard

The defense plans are simple on paper, but not so simple to carry out. The idea is to locate the enemy—the foci of infected ground squirrels and other rodents—and if he is found near human dwellings or camp sites, to drive him out.

With shotguns and traps and motorized laboratories, the field crews travel about the western states, looking for plague-infected rodents. If they hear of a locality where large numbers of dead ground squirrels have been found, they hurry to the spot to examine the bodies and see if they were plague victims. Otherwise they roam the countryside, searching the rodent population for signs of plague. After they have shot or trapped or otherwise collected the animals, they remove all fleas from the bodies and the carcasses are examined for gross evidence of plague.

A fraction of the fleas obtained from each day's hunt are placed in alcohol for identification and the balance are placed in one per cent. salt solution. Those in salt solution, and tissues from animals with suspicious signs of plague, are inoculated into guinea pigs to determine the presence of plague germs.



DOTS OF DEATH

The deadly germ that causes plague, Pasteurella pestis, under the microscope.

This flea inoculation method, developed about two years ago, has more than doubled the chances of finding foci of sylvatic plague infection, Dr. Eskey says. It enables the plague fighters to find plague in regions where it was impossible to find any plague-infected animals. It has the advantage of being a method that can be successfully used by men who have had little or no training in a plague laboratory.

The material collected by the nine field units of the U. S. Public Health Service is sent to the Public Health Service's plague laboratory on the grounds of the U. S. Marine Hospital at San Francisco. This is general headquarters for the federal government's plague fighting force. Plague fighters of the state health departments and rodent control units of the Biological Survey cooperate with the Public Health Service, although each works independently.

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RADIO

Static-Free Short Waves Planned to Aid Aviation

POINTING the way toward eventual adoption of ultra short wave radio communication by the air transport industry, month-long tests on a skyliner between New York and Pittsburgh have shown the practicability and freedom from static of ultra high frequency radio waves, the Western Electric Company has announced.

Radio waves of a frequency of 125 megacycles were almost entirely free of static in tests which covered a wide variety of test conditions, it is reported. Elimination of static has been one of the major problems of aviation communication systems and is particularly important during winter operations when storms are more frequent.

Tests were conducted on a regular Transcontinental and Western Air transport plane, which carried its full complement of regular radio equipment while the tests were being conducted. The chief handicap to ultra short waves is the fact that they do not travel beyond the horizon, thus limiting their effective range.

Science News Letter, August 27, 1938

PLANT PHYSIOLOGY

Death of Cells in Roots Makes Ventilation Spaces

CELLS dying that other cells may live furnish the explanation of the air spaces found in the roots of plants like waterlilies, cattails, and other forms that grow in unaerated soil and yet must have oxygen to sustain life. Air from above passes down through these spaces, and carbon dioxide waste presumably goes out through the same channels.

But the death of cells in such root tissues is not a nobly self-sacrificing piece of altruism. They just can't help it. They happen to be the ones that suffocate first when the oxygen is cut off, and their breakdown leaves air passages open, so that the rest don't need to die. And thus the roots, and the whole plant, are enabled to survive.

The story of the formation of these ventilation shafts through living root tissues has been studied by Dr. D. C. McPherson of the University of Toronto.

Dr. McPherson used in his experiments only plants that do not normally need or have air passages through their roots, principally corn. When corn plants were grown with their roots deprived of oxygen, groups of cells died and degenerated, leaving spaces open, through which the remaining tissues obtained the necessary air. Parallel plantings with plenty of oxygen in the soil did not form air passages.

Some other plants, like peas and beans, proved unable to form air passages even though oxygen starvation killed cells in their roots. This was because a hard chemical compound, calcium pectate, formed in the cell walls, preventing them from breaking down when they died. Corn cell walls, made of softer stuff, can and do disintegrate.

Dr. McPherson considers that water-dwelling plants that normally have air spaces originally had none, but developed them in response to physiological need as they came to grow in unaerated soils. But now they are so accustomed to having these ventilation passages that if they are forcibly prevented from forming them they will die.

Science News Letter, August 27, 1938

ASTRONOMY

Small Telescope Makes Important Discovery

YOU RIGHTLY hear much about the giant telescopes having 100-inch and 200-inch diameter mirrors, and the wonders of the heavens they show and will reveal. But it should not be overlooked, as is sometimes done, that excellent and important work is being performed with small equipment.

The discovery of the brightest stellar object ever observed—having a luminosity equal to 400,000,000 suns—which was recently announced by Prof. Fritz Zwicky of California Institute of Technology, is a splendid example of a major discovery made with a small telescope.

Using an eighteen-inch Schmidt type telescope, Prof. Zwicky has been photographing the sky for over a year at Mt. Palomar, on the site of the great future observatory which will house the still-to-be-completed 200-inch telescope.

With this Schmidt astronomical camera, having an extremely wide field of view, Prof. Zwicky has obtained some 600 good photographs of distant nebulae.

Three super-nova stars were found, giving complete confirmation for the previous suspicion of the existence of two types of temporary stars; novae and super-novae.

One of the super-novae, known as I. C. 4182, has turned out to be the brightest stellar object ever discovered, according to calculation by Prof. W. Baade, who is Prof. Zwicky's colleague.

Science News Letter, August 27, 1938

IN SCIEN

PHYSICS

Meet Exciton and Phonon, New Words in Physics

YOU CAN add two new words to your vocabulary, introduced by Dr. Edward Teller of George Washington University in Washington, D. C.

Listening to a new explanation of the old phenomenon of phosphorescence, scientists attending a Stanford University summer conference on photochemistry, heard the words "exciton" and "phonon" as new descriptive terms applied to subatomic particles whose behavior under certain conditions produces phosphorescence.

Light may excite two kinds of energy when it strikes a solid body, Dr. Teller believes. It may excite electronic energy, the moving particle thus resulting from the impact of the light being defined by the scientists as an "exciton." A particle vibrating from the other type of excitation for which he holds light responsible Dr. Teller calls a "phonon."

Science News Letter, August 27, 1938

GEOLOGY

Oil Flows From Well Bored Beneath Mississippi River

DRILLED in utmost secrecy and with the application of several novel methods, the first oil well ever drilled inside the levee of the Mississippi River has begun to produce oil from a deposit more than 6,000 feet below America's mightiest stream. More than 200 barrels of oil a day are coming in.

Digging of other wells on river bottom land inside the walls that protect the countryside and systematic tapping of the pool below the river is expected as a result of the success of the discovery well. Forty-foot pilings had to be driven into the river bottom land to support the drilling rig and a plank road had to be laid over the mud to transport tools and supplies.

The well is producing through tubing perforated from 6,358 to 6,364 feet. More than 4,100,000 cubic feet of natural gas are also being produced daily.

Science News Letter, August 27, 1938

NCE FIELDS

ECONOMICS

War Makes It Hot for Japanese Office Workers

OWNERS of air-conditioned buildings in Japan are having difficulty in securing supplies of refrigerants to keep their plants running and their buildings cool, the American Commercial Attache in Tokyo reports. Blame for the situation is fixed on the current war.

Ammonia, widely used as a refrigerant, is being used for military purposes, considered by the authorities more important than mere cooling of buildings Methyl chloride, another agent used, must be imported. But control of foreign exchange has made impossible purchases of the substance.

Science News Letter, August 27, 1938

BIOCHEMISTRY

Coal, Water and Air May Make Meat for Germany

GERMANY, already enduring economic siege conditions, and apprehensive of the sterner blockade of war, looks increasingly to her chemists to make her internally self-sufficient. Newest among projects that would smack of magic if they were not based on well-determined scientific principles is one to make coal, water and air the ultimate sources of a meat supply.

The key to this biochemical paradox is the yeast cell. Yeast produced in great masses and fed on cheap carbon-containing foods, plus nitrogen-containing mineral salts, will yield about half its dry weight in crude protein, the stuff lean meat is made of. This yeast protein is not suitable for direct human consumption, but it can be fed to livestock and thus transformed into meat and milk.

During the World War, yeast was raised in considerable quantities, on beet-sugar molasses, waste liquor from starch factories, and similar low-grade carbohydrate sources. The nitrogen part of the diet was synthesized out of the air.

After the armistice, mass production of yeast feed became unprofitable, due to the competition of imported meat and cattle feeds. However, experiments have continued, with the objective of making yeast production cheaper. Promising materials have been surplus potatoes, and sugar made from wood.

Now, according to Dr. K. R. Dietrich, chemist of Berlin-Dahlem, strains of yeast have been isolated that do not need sugar but can thrive perfectly well on such carbon-containing compounds as lactic acid, acetic acid, glycerin, and even ethyl alcohol, plus of course the usual ration of nitrogen captured from the air.

But some of these compounds can now be produced from coal and lignite, by new synthetic processes. Hence the prospect that some day German steers may be making beefsteak out of coal, air and water, via the humble yeast cell.

Science News Letter, August 27, 1938

GARDENING

New Lawn Plants Free Slaves of Lawnmower

THERE should be a new radical hymn themed to: Arise, Slaves of the Lawnmower! Much as everyone admires a sweeping, velvety spread of beautiful grass, it is true that good lawns do enslave their creators.

Two inventions helped man become thus enslaved to lawns. One was the lawnmower and the other the rubber garden hose. With these two devices, plus plenty of work, you can grow a lawn that rivals the putting greens of the golf courses in quality.

But what kinds of lawns were there before the days of the lawnmower and garden hose? There were some mighty good ones, and some of them, in England for example, have been growing for generations without the lawn slavery which the more modern, delicate lawn grasses require.

Camomile lawns are a favorite for bowling greens in England because they are very resilient and stand well the wear of walking feet. A few plants spread out in a lawn will drive grass out, so vigorous is camomile's growth. Thyme occasionally has been used as a lawn plant and yarrow likewise. In California *Lippia* is sometimes used.

But the lawn plant *par excellence* is the small turfing daisy, *Matricaria tchihatchewi,* which ought to make life easier for the man of the house. This plant gives a thick green foliage never more than two inches high. It does not need watering, will grow almost anywhere except in deep shade or very sandy soil and requires no more than one cutting a year.

Science News Letter, August 27, 1938

ETHNOLOGY

Indian Place Names Often Unflattering to Neighbors

BECAUSE Southwest Indians dubbed the neighbors Utes, meaning hillbillies, we have a state named Utah.

And when Sioux Indians yelled "Cheyenne!" at another tribe, they didn't smile. They meant barbarian, or "doesn't speak our language," and they resented the foreign Indians being in the "Cheyenne" valley.

To such long-buried origins in American prehistory, Dr. John P. Harrington of the Smithsonian Institution is tracing our Indian place names.

Ute Indians did not call themselves by that name, Dr. Harrington has determined. Apaches and Navajos dubbed them Utes, meaning in their speech, highlanders or upper people.

Tacoma got into our geography by a double mistake, he finds. The word Ta-ko-bed was Puget Sound Indian language for any snowy mountain in sight. But early settlers mistook this word for the specific native name for Mount Rainier, and then mispronounced it besides.

As for Seattle, Dr. Harrington links it with the name of an influential Indian, Seh-Ahl, but what Seh-Ahl means, if anything, is yet to be found out.

Science News Letter, August 27, 1938

PALEONTOLOGY

Old Mongolian "Bear-Cat" Had Astonishing Skull

ASIA WAS a land of giants, early in the Age of Mammals. Already we known about the mountain-sized rhinoceros, the Baluchitherium. Now Dr. Walter Granger of the American Museum of Natural History describes an enormous flesh-eater skull brought home by Dr. A. Z. Garber, surgeon on one of the museum's expeditions.

The creature belonged to the group known as the creodonts. They have no living relatives, and can be only remotely described as something like bears and something like clumsy wildcats.

The giant creodont now described by Dr. Granger had a head that must have been all of two feet long in life, for the skull is about twenty inches long. It was approximately fifteen inches wide, and the eye teeth projected over two inches from the jaws.

He has been given the scientific title *Sarkastodon mongoliensis.*

Science News Letter, August 27, 1938

ASTRONOMY

Huge Star Found to Consist Of Stuff Thinner Than Vacuum

Larger Member of Eclipsing Pair, Zeta Aurigae, 10,000,000 Times Size of Sun, is Very Tenuous Gas

OBSERVATIONS at Mount Wilson Observatory have enabled scientists to determine, for the first time, the size and physical characteristics of the only eclipsing stars in outer space in which astronomers are particularly interested. An eclipsing star is really a pair of stars that revolve around each other. An eclipse occurs each time one member of the pair passes between us and the other member.

The largest star in the eclipsing system, named Zeta Aurigae, is equivalent in size to about 10,000,000 of our suns, while the smaller is also much larger than the sun. The large star is approximately 20 times the diameter of the smaller, hotter star. The largest star in the system is a giant "K" type star.

Two Eclipses Watched

The most striking feature about Zeta Aurigae is that the large star is as dense as the vacuum of an electric bulb.

This new information about Zeta Aurigae is outlined by William H. Christie, noted Mount Wilson astronomer, who has observed the last two eclipses, in a leaflet published by the Astronomical Society of the Pacific.

The eclipse occurs every 973 days, the larger star passing before the smaller. The eclipse lasts about 37 days.

Mr. Christie explained that the reason for the great interest in the Zeta Aurigae eclipses lies in the fact that it is the only star known, other than the sun, in which man can actually measure the heights to which various elements constituting the atmosphere of a giant star extend.

The stars, fortunately, are equal in brightness in the photographic region of the spectrum, by which they are studied.

"The system of Zeta Aurigae," Mr. Christie explained, "provides us with the means of obtaining cross sections, as it were, of the atmosphere of a giant K-type star. Perhaps other systems, such as this, may eventually be found, but it is not likely that many similar systems exist that are bright enough to be readily observed. However, if a number of such systems of different atmospheric characteristics are found, we shall obtain much valuable data as to the structure of stellar atmospheres as a whole."

The astronomer pointed out that although the eclipsing stars are immense, their mass is not so many times greater than that of the sun.

"The larger star of the pair turns out to be about 15 times the mass of the sun; the smaller, about eight times," said Mr. Christie. "Since these stars are very bulky it means that the matter of which they are composed is much more thinly diffused than in the case of the sun. The density, or amount of material per unit volume, is quite low.

"The smaller star has a density of about one hundredth, the larger but two millionths, that of the sun. The larger cool star is, then, on the average about as dense as the vacuum in an electric light bulb."

By the same reasoning, Mr. Christie expressed the opinion that the density of gases near the outer boundary of the star's atmosphere makes the vacuum in the electric light globe seem a solid object by comparison, for probably no vacuum producible on earth is as rare as these outermost layers.

Science News Letter, August 27, 1938

CHEMISTRY

Rare Metals Wasted Up England's Chimneys

RARE metals in large quantities go up Britain's chimneys in smoke, Dr. Gilbert Morgan and G. P. Davies of the Teddington Chemical Research Laboratory have discovered by analyzing many samples of soot and smoke. More than 2,000 tons of the element germanium, 1,000 tons of gallium, and comparable quantities of silver, indium, cerium, lanthanum, and vanadium are thus wasted.

These elements are present in small quantities in coal, and are lost up the flue when the coal is burned or coked to produce gas. Practical means for their recovery have not yet been suggested.

Science News Letter, August 27, 1938

ANCIENT SIAMESE TWINS?

Did prehistoric Indians in Chile marvel over the birth of Siamese twins to some Indian mother? That is what Chilean scientists would like to know, since they have found this stone statue, 17½ inches high, near the town of Angol. Stone images of human beings are extremely rare in Chilean archaeology, and nothing like this has been reported before. The image was made by a little-known prehistoric people who buried their dead in earthenware jars and made decorated pottery, the colors of which remain fresh today.

PHYSICS

Average American's Suit Is Poor Light Reflector

THE AVERAGE American male wears a "neutral gray suit having a reflection factor of about 4.5 per cent." It doesn't make too much difference what kind of light is the source of illumination.

No fashion note is this, but the result of a study by two Massachusetts Institute of Technology scientists endeavoring to determine the visibility of the average male pedestrian on a road at night. It means that he isn't too visible against a dark pavement to the man behind the wheel.

Cloth samples to the number of 229 were tried by Prof. Parry Moon, student of lighting, and Dr. M. S. Cettei, they report in the current issue of the *Journal of the Optical Society of America.*

Work such as this is part of the increasing study being devoted to highway and motor vehicle headlight illumination, one of the most important angles of the safety problem.

Science News Letter, August 27, 1938

PSYCHOLOGY

Swindlers Depend Upon Weaknesses of Victims

SEX and greed and other weaknesses common to all men are used as the levers by which the swindler separates the "innocent victim" from his hard-earned cash.

From internationally notorious "con" man to humble thrower of phoney dice, the swindler is likely to present a typical picture, psychologically, and to operate in much the same sort of "swindle situation," it was found by Drs. Walter Bromberg and Sylvan Keiser, New York psychiatrists, who studied 50 swindlers in the Psychiatric Clinic of the Court of General Sessions.

Suave of manner, elegant in dress, talkative and companionable, the swindler ingratiates himself and makes an impression on the victim. Foreign accent, titles, professional degrees, may be the "props" with which the swindler dresses his stage.

Like a lover he woos the victim. Artfully he plays upon his emotions until they over-ride and cloud his judgment. The victim, although ordinarily a sensible person, is then ready to be taken in by the most blatant trickery.

It is a common trick for the swindler to build up sexual tensions in his victim until his judgment is blinded, these investigators note in their report to the *American Journal of Psychiatry*. A burlesque show, a few drinks, and a party for the entertainment of women are often the preludes to a card game in which the victim is relieved of his cash.

Another class of swindler, working on impressionable women, marries the victim preparatory to making off with all her money.

"Deep in the psychology of every victim can be glimpsed the presence of two infantile tendencies," the psychiatrists found. "First, the universal wish for unlimited money, and second, the feeling of personal infallibility. The swindler, we feel, is aware of these deeper psychologic currents in the victim and utilizes them in his technique.

"He woos the victim, but in so debasing himself, is able finally to outwit the victim. It is common for the offender to complain that his victims themselves literally begged him to take their money. The swindler feels himself, and often is, the sought-after party to the transaction."

Science News Letter, August 27, 1938

PALEONTOLOGY

Mass of Whale Fossils Near Vienna Explored

LITTLE whales once swam warm seas where Vienna now stands. They were ancestors of modern giant whale species, but were only a fraction of the size of their modern descendants.

The greatest deposit of fossil whale remains in the world has been found near the ancient Austrian capital, in an area formerly worked for clay by a brick manufacturing concern. The clay was the sea bottom of some tens of millions of years ago. The deposit has been studied by Prof. Julius Pia.

Notable are the skeletons of finwhales, ancestors of seventy-footers that swim the seas today. But these ancestors were only from nine to fifteen feet long. Other skeletons, representing ancestors of present-day right whales, are so small that they were first thought to be dolphins. Only careful comparative anatomical studies established their real identity.

Science News Letter, August 27, 1938

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Wilson, Henry Van Peters, 1863–
University of North Carolina

1938. Behavior of the epidermis in sponges (Microciona) when treated with narcotics or attacked by aquarium degeneration

J. Exp. Zool., v. 79, no. 2, Oct. 5

The epidermis including the marginal films, peripheral sheets of cytoplasm with a single layer of nuclei, is syncytial in reunition sponges (Microciona). The cytoplasm is, typically, reticulate in appearance.

Under the influence of chloral the syncytial epidermis may break up into cell-like pieces, owing to excessive vacuolar degeneration between nucleated regions. The degeneration is traceable to changes in the microscopic architecture of the cytoplasm. In such cases the nuclei seem to exert a directive influence on the progress of vacuolation. The cytoplasm eventually loses its optical structure and the nuclei also degenerate. Vacuolar degeneration may be diffuse without the production of cell-like pieces.

Chloretone has a similar but not identical effect. A non-nucleated area may divide into pieces, showing that nuclear control over vacuolation and consequent cytoplasmic division is unnecessary for such division. Aquarium degeneration may lead to results very similar to those induced by drugs.

Epidermal lines are again recorded and interpreted as structures produced through rearrangement of the meshes (alveoli probably) of the epidermal membrane.

Histology, epithelial tissue **Microciona**

Physiology, degeneration

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ASTRONOMY

Venus, Saturn, Jupiter

Three Planets Shine in Evening Sky, as September Brings Beginning of Autumn; Mars and Mercury in Morning

By JAMES STOKLEY

JOINING the stars of the late summer evening, we now have three planets. Like the earth, they revolve around the sun and form part of the solar system. Unlike the stars, which are glowing globes of gas, shining with their own light, the planets are visible only by the sunlight they reflect.

Soon after sunset Venus is visible in the southwest. More brilliant than any other star or planet, it is easily located. It does not, however, appear on the accompanying maps, for these show the heavens as at ten o'clock on September first, nine on the fifteenth and eight on the thirtieth. Venus sets about an hour and a half after the sun.

The other planets, Jupiter and Saturn, are easily visible through most of the night, and are indicated. Jupiter is much the brighter of the two, about 15 times the brilliance of its neighbor. It is seen high in the south in Aquarius, the water carrier. Saturn is in Pisces, the fishes, farther to the left.

Of the other planets that constitute the solar system, only two are visible to the naked eye, and these are now morning stars. That is, they appear in the east before sunrise. About the middle of the month Mercury will be visible in this way, in the constellation of Leo, the lion. Mars is also in Leo, near Mercury on the fifteenth, but only about a sixth the brightness, so that it will be difficult to locate in the morning twilight.

Vega, of Lyra, the lyre, is the most prominent star this month in the evening. It is nearly overhead, a little west of the zenith. Of all the stars seen from most of the United States and Canada, only one exceeds Vega in magnitude. This is Sirius, the dog-star, conspicuous in the winter evenings, but now visible in the southeast about four o'clock in the morning.

Directly overhead, for the times of the maps, is Cygnus, the swan, frequently called the Northern Cross, because of its shape. The top of the cross, marked by the star Deneb, is to the northeast, and the bottom to the southwest. It is right in the heart of the Milky Way, which is now in a good position to view. To the south of the bottom of the cross is Aquila, the eagle, with first magnitude star Altair. With one fainter star just above, and another below, it is easily recognized.

The "Great Dipper," of Ursa Major, the great bear, is sinking low into the north on September evenings, with the "pointers," which show the direction of the pole star, at the right. To the left of the dipper's handle is Bootes, the bear driver, with brilliant Arcturus. By next month this will be gone from the evening sky, but equally low in the northeast the maps show a star which will take its place, Capella, in Auriga, the charioteer.

This month Venus and Mercury are visible, the former as an evening, the latter as a morning star. Venus is more than two and a half times as far from the sun, in angular measure, as Mercury. Yet, around the 12th, Venus sets about an hour and a half after sunset, while Mercury rises approximately the same duration before sunrise.

Angle of Ecliptic

This is due to the angle made by the ecliptic, the imaginary line through the sky which marks the path of the sun and of the planets. Half of it goes through the southern hemisphere of the sky, and half through the northern. In the evenings this month, the southern half is in the visible sky and the angle that it makes with the western horizon is only about 27 degrees, in the central latitudes of the United States.

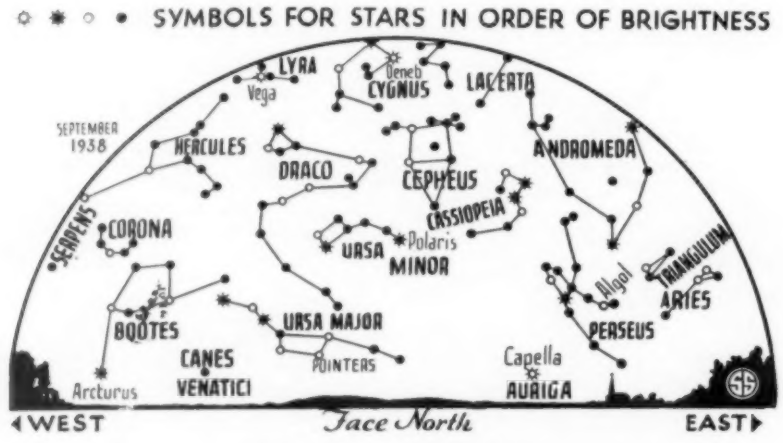
The elongation of a planet is always measured along the ecliptic. On September evenings, when the ecliptic is so nearly parallel with the horizon, the planet, even at its greatest distance from the sun, is only a little above the western horizon when the sun is setting, and hence it follows soon after. This happens this month with Venus.

But in the evenings of later winter and early spring, as well as just before sunrise at present, the northern half of the ecliptic is in the sky. The angle with the horizon is then around 67 degrees. Therefore, when the sun is just at the horizon, Mercury is quite high, because it is so nearly directly above the sun.

This month brings us, on the 23rd, the autumnal equinox, which is the beginning of autumn. At that time the sun is directly over the earth's equator, and day and night are approximately of equal length. In the southern hemisphere this is the beginning of spring.

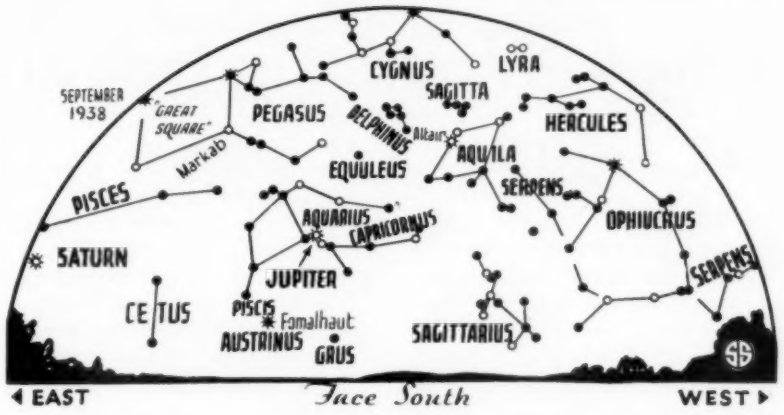
Phases of the Moon

		E. S. T.
First quarter	Sept. 1	12:28 p. m.
Full moon	Sept. 9	3:08 p. m.
Last quarter	Sept. 16	10:12 p. m.
New moon	Sept. 23	3:34 p. m.



THE SWAN FLIES HIGH

Cygnus, near the zenith, dominates the northern sky, with its great shining cross easily traceable. Lower down, the two bears keep up their endless circling around the Pole Star.



FIVE PLANETS SHINE

The sky of early autumn puts on an especially fine planetary show, with three planets visible at night and two just before dawn.

BACTERIOLOGY

Studies Germ-Killing Power of Toothpastes

IN THIS germ-conscious world of ours a good many persons have the idea that they would like to keep their mouths not only clean but free of germs. The idea is probably based on knowledge that germs of many diseases enter the body through the mouth and nose and is probably strengthened by antiseptic claims made for some toothpastes and mouthwashes.

Without going into the merits of the idea, it can safely be said that the job of keeping the mouth free of germs is herculean if not altogether impossible. Much has already been written on this subject and just recently Arthur H. Bryan, bacteriologist of Baltimore City College, published results of studies he made on antiseptic toothpastes.

He used ten different methods of studying these. An average of the number of germs or bacteria in the mouth of each of his student-volunteers was established, and the students then were given various tubes of commercial toothpastes or powders and asked to use them regularly three times a day for a period of three weeks to one month. During this time frequent checks were made on the bacteria in their mouths.

The antiseptic property of the toothpastes was compared with that of phenol (carbolic acid) and found to be somewhat lower. From this it appears that these antiseptic toothpastes are not strong enough to harm gums, tooth enamel, or tongue and cheeks.

Recently extracted teeth were soaked in solutions of the toothpastes, and others were mounted in blocks and brushed with an electric dental machine continuously for one hour with the various toothpastes.

The significant conclusion of these and the other tests was that the use of the dental creams decreased the number of bacteria in the mouth for one hour after use, but at the end of this hour the number of bacteria increased and at the end of two hours was as high or higher than before.

Science News Letter, August 27, 1938

PSYCHOLOGY

Now a Clinic to Teach Pedestrians How to Live

A CLINIC where men and women are treated not for tuberculosis or heart trouble, but for automobile accidents, or "pedestrianitis" as a physician might term it, that is the strange outgrowth of traffic conditions in our twentieth century cities.

Automobiles, as everyone knows, are a bad enough hazard for drivers. But the driver is at least somewhat familiar with the workings of his and other cars.

Pedestrians, in a great many cases, know nothing whatever about cars. They may have been brought up in a day when speeding vehicles were confined to railroad tracks. They are completely unaware of the difficulties of quickly stopping a rapidly moving car. They have never tried to see through a clouded windshield or skidded on a glassy pavement. They may not even realize that in the blinding glare of headlights, they may walk unknowingly into the path of an oncoming car.

A clinic for testing and instructing pe-

ZERO TO EIGHTY

by Dr. E. F. Northrup

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destrians established in Wichita has been the scene of a new study of pedestrian hazards. These have been analyzed by Dr. Harry R. DeSilva and W. H. Frisbee, Jr., of Harvard University, together with a study of pedestrian deaths in Connecticut.

Eye defects are a serious danger to the pedestrian, especially "tunnel vision" which restricts the field of vision to what is directly ahead. If informed of his defect, however, he can compensate for it by using greater precaution. Many pedestrians are lacking in ability to judge the speed of an approaching car. In the clinic miniature cars operated at various speeds controlled by the examiner serve as a means for developing this essential type of judgment.

Science News Letter, August 27, 1938

PHYSICS

Radium Lost is Often Recovered by "Hound"

YOU PROBABLY have not met a "radium hound" but he is a valuable creature, with a very scientific ability at playing "needle in the haystack" to the tune of thousands of dollars. He is in a class with divining rods. Who named him is not known and fortunately his pointing abilities are not frequently required.

Born in the physics laboratory, the "radium hound" is not a dog but an instrument, either the electroscope or the Geiger-Muller counter, both of which are affected by the gamma radiation given off by radium.

Radium is precious stuff and when it is used in the treatment of cancer and other diseases it is sometimes lost. The amount used is so small and seemingly insignificant that patients often can not be made to realize its value. A hundred milligrams in the form of a salt occupies the space of about a quarter inch of pencil lead. In former days this small amount cost $12,000, and while the price of radium has been reduced materially a heavy investment is still necessary.

Dr. Robert B. Taft, of Charleston, S. C., has compiled amusing anecdotes and statistics on radium losses and the methods of recovery. There are 107 records of losses with 59 complete and 11 partial recoveries.

In one case Dr. Taft found some radium that had been on a dump for several weeks. In another case he saved an innocent man from going to jail on circumstantial evidence of radium theft.

Science News Letter, August 27, 1938

FORESTRY

Southern Woodpulp Industry Faces Difficult Problems

PULPWOOD from Southern pines, for newsprint paper and possibly for rayon and other synthetic cellulose products is at present one of the most hopefully regarded possibilities on Dixie's economic horizon. But it isn't going to be an easily shaken plum-tree, with all profits and no problems.

A recent discussion held under the auspices of the Society of American Foresters, and participated in by timber owners and operators as well as professional foresters, brings strongly into focus some of the difficulties the industry has to face.

Already existing forest products industries in the South watch the new development with some anxiety, for trees can be cut for pulping purposes long before they are of sawlog size, and even before they can be slashed for turpentine. However, it is rather generally agreed that if woodlands are properly handled, under adequately trained professional supervision, pulpwood cuttings can be legitimately made without endangering either the lumber or the naval stores industry.

But even within its own particular field, the woodpulp industry in the South has problems which must be solved if it is to become established on a permanent basis, and not degenerate into another extractive, exploiting, migratory industry, causing local booms for a few years and then moving out of the stripped communities, leaving them collapsed and impoverished.

A particular evil is the present method of purchase. The mills do not buy directly from the timberland owners, but through contractors, who in turn frequently operate through sub-contractors. These men have no interest in maintaining sustained yield from the forests, but on the contrary have the strongest incentive to cut the land clean, frequently with the connivance and even the insistence of the smaller landowners.

Sounder economic and personal relations among the industry, the timber owners and the public not only in this matter of procurement but also in such things as fire prevention, tax legislation, and forest-consciousness generally, are regarded as necessary for the development of a really healthy woodpulp industry in the South.

Science News Letter, August 27, 1938

GEOLOGY

North Carolina's Legend Of Hoofprints Explained

NEW ENGLAND may have its famed legend of the headless horseman but North Carolina too has a "horse" legend; one of everlasting hoofprints which is a bit nearer reality than the fiction of Washington Irving.

Near Bath, N. C., are eight shallow depressions in the ground which legend says originated when a bucking racehorse threw his profane rider against a tree and killed him. The eight marks, conveniently placed to fit the story, indubitably exist and they have persisted for over a century according to records.

Thousands of visitors, at one time or another, have viewed them and efforts to fill them up—and make them stay filled—have failed. Around Bath you can talk with grown men, who as children tried to do this. Temporarily they succeeded but ever the hoofprints reappeared.

Two suggestions with some scientific reason have been advanced as the explanation of Bath's mystery hoofprints. Those with a geological turn of mind suggest that the prints are the external ends of small vents, filled with earth, which terminate in underground caves. Gradually, through erosion, the earth in these vents settles, no matter how often they are filled.

Soil chemists like Prof. C. D. Williams of the North Carolina State College, in Raleigh, suggest that the cause may be due to the underground presence of marl which goes slowly into solution. This marl is calcium carbonate and was formed by deposits of shells when the area was covered by the Atlantic.

Science News Letter, August 27, 1938

Inexpensive Summer Fun

Autumn Fruits and Seeds Fine to Collect

(Eleventh of a series of 12 articles. Next week—Collecting Skulls and Bones)

SUMMER is waning, only the late wildflowers are left, and soon leaves will be changing from green to yellow and red. Yet the collector's holiday is by no means over. Autumn brings the harvest, when men gather in the fruits of the season and store seed for next spring. Harvesting fruits and seeds can give the nature collector some very interesting hours, too, and provide him with treasures for more leisurely study later on.

Most satisfactory, and easiest to keep, are dry-fleshed fruits, nuts, acorns, and seed-pods. These need no particular care, beyond keeping them separate in boxes or trays. A little more attention must be given to the winged seed groups of certain trees, like hard maple, linden or basswood, and the various species of ash. These dry membranes are easily broken, so it is best to give a small box to each group of specimens, to prevent breakage from too much shaking and jostling.

Less easy to keep are some of the fleshy fruits, such as red-haws and wild crabapples. Wild grapes, of course, will hardly keep at all. However, even the perishable fruits are worth collecting and studying as long as they last. The edibility of some of them will suggest appropriate disposal when scientific purposes have been served!

Not all the fleshy fruits are thus perishable, of course. Some, like bittersweet, are so lasting that they are much used as permanent winter bouquets. The same use is made of dried seed-pods and seed-heads of such plants as lotus, and even of weeds like teasel and jimsonweed. The practice of "decorating" these with iridescent paint, however, is really just a bit too "arty"; and for a natural history collection it is not even to be thought of.

Just collecting your harvest into boxes, however, is not the whole story. Comparative study is the key to the real value of collections of any sort. So get generous samples of the fruits of any kind of tree or bush that interests you, keeping the harvest of each individual in a separate container. In the evening, spread out your takings on the table, and ask yourself questions about them.

In just how many ways, for example, are the acorns of white oak, black oak, red oak, and bur oak different from each other? In how many ways are they alike? Make a tabular list of differences and likenesses. Do the same for other related species, such as the different kinds of hickory nuts, or walnuts and butternuts, or evergreen cones, or the pods of black locust, honey locust, and Kentucky coffee tree. Even different kinds of cockleburs can yield interesting information in this way.

Finally, most of the fruits in your collection can have their seeds extracted, to be kept in tight envelopes, pillboxes, or small vials until next spring. It will be interesting then to plant them, find out what percentages of the various kinds will grow, and see what the plants and seedling trees look like when they are very young.

For more information about collecting fruits and seeds and a list of books and pamphlets on the subject, send us a postcard with your name and address. Ask for Bulletin 11. Address Science News Letter, 2101 Constitution Ave., Washington, D. C.

Science News Letter, August 27, 1938

ZOOLOGY

Moose Looks Like Creature Of Earlier Geologic Age

See Front Cover

SOME animals impress us more as survivors from an earlier geologic age than as normal inhabitants of the present-day earth. Rhinoceros and elephant, giraffe and kangaroo, somehow give us the impression of belonging to the pliocene rather than to modern times.

Most creatures that we instinctively half-disbelieve even when we see them belong to the tropics, but a few live in cooler lands. Probably the most incredible-looking of North American mammals is the bull moose, with his almost elephantine size and his massive head with its tremendous spread of palmate antlers.

We commonly think of the American moose as just one species of animal, but zoologists are fairly well agreed that the slightly smaller moose that inhabits the borders of Yellowstone National Park is distinct from the Canadian moose. The photograph on the cover of this week's SCIENCE NEWS LETTER is by J. E. Haynes.

Science News Letter, August 27, 1938

• Radio

Every Friday at 7:30 p. m. EDT, 6:30 p. m. EST, 5:30 p. m. CST, 4:30 p. m. MST, or 3:30 p. m. PST, Science Service cooperates with the Columbia Broadcasting System in presenting over the Columbia coast to coast network a new series of "Adventures in Science" presenting dramatizations of important scientific advances and discussions by eminent scientists.

•First Glances at New Books

Zoology

OUR FRIENDLY ANIMALS AND WHENCE THEY CAME—Karl Patterson Schmidt; illus. by Walter Alois Weber—*Donohue,* 64 p., illus., 12 colored plates, $1.50. The author is a zoologist in the Field Museum of Natural History, so it may be taken as assured that his statements are in line with the best present scientific knowledge. At the same time the book is styled so that a bright nine- or ten-year-old can read and enjoy it. The twelve colored plates are superb. Many of the marginal illustrations that liven every page are taken from ancient monuments.

Science News Letter, August 27, 1938

Entomology

THE BOOK OF INSECT ODDITIES, WHERE THE STRANGE INSECTS OF THE WORLD ARE FOUND—Raymond L. Ditmars—*Lippincott,* 63 p., illus., $2. The strange appearances and even stranger habits of some of the citizens of the insect world make tales that are never told to the tiring point. Here are selections from all over the world, interestingly related and vividly pictured. Entertaining to leaf through as a picture book if you're not feeling energetic, fascinating to read closely if you've an appetite for an hour or two of nature study.

Science News Letter, August 27, 1938

Science—Biography

THE NOBEL PRIZES AND THEIR FOUNDER ALFRED NOBEL—Fritz Henriksson—*Bonnier, Stockholm,* 59 p., illus., $1. A useful and authoritative listing of Nobel prize winners is contained in this booklet, which tells just how the recipients are selected. Through biography and text, the qualities of the founder are illuminated.

Science News Letter, August 27, 1938

Physics

SECOND REPORT ON VISCOSITY AND PLASTICITY—Prepared by the committee for the study of viscosity of the Academy of Science at Amsterdam—*Nordemann,* 287 p., illus., $7.50. Technical and comprehensive treatment of structure of liquids, viscosity related to chemical and physical constitution, the yield value, plastometers, and viscometers.

Science News Letter, August 27, 1938

Architecture

PAINTING AND DECORATING ESTIMATING—J. Ralph Dalzell and Alvah Horton Sabin—*Amer. Technical Soc.,* 152 p., $1.50. Here is a manual of painting either for those amateurs who wish to learn how to apply paint and varnish to their homes and other structures, or to every-day painters who wish to learn some of the better techniques and so improve their jobs.

Science News Letter, August 27, 1938

Chemistry

BREATHE FREELY! THE TRUTH ABOUT POISON GAS—James Kendall—*Appleton-Century,* 179 p., $1.50. This British writer seems not to "have the wind up" as much as many of his contemporaries. He sees the gas-raid danger to civilian populations as very considerably inflated by alarmists, and especially by scare-mongering journalists whose copy naturally sells better if they make it good and lurid.

Science News Letter, August 27, 1938

Surgery

AS OTHERS SEE YOU: THE STORY OF PLASTIC SURGERY—Henry J. Schireson—*Macauley,* 322 p., plates, $3. Thousands of persons walk the streets today, presenting normal countenances to a world from which they might otherwise shrink, thanks to what plastic surgery has done for them after disfiguring accidents or war injuries. This book tells how the scalpel is used to remove scars of both the flesh and the spirit.

Science News Letter, August 27, 1938

Geology—Engineering

REGIONAL PLANNING. PART VI—UPPER RIO GRANDE—National Resources Committee—*Govt. Print. Off.,* 2 vols.: vol. 1, Text, 566 p., vol. 2, Maps, $3.50. A detailed study of the water resources and development of one of the great U. S. river systems, lying in Colorado, New Mexico and Texas.

Science News Letter, August 27, 1938

Mathematics

PLANE GEOMETRY—George T. Major—*Scribner's,* 280 p., $1.20. It must be encouraging to the pupil to see photographs of snow crystals, bridges, starfishes, cathedrals and other common things used in this text as examples of applications of geometry.

Science News Letter, August 27, 1938

Paleobotany

STARUNIA: NO. 15. RÉSULTATS DES RECHERCHES PÉTROGRAPHIQUES D'ESSAI SUR LES MORAINES DU CENTRE ET DU NORD DE LA POLOGNE—*Polish Academy of Sciences,* 64 p.

Science News Letter, August 27, 1938

Sociology

BRASS TACKS—A. G. Keller—*Knopf,* 233 p., $2. The professor of science in society at Yale specifies "certain ways of leading life in society which, together with certain virtues, have been indispensible to progress and even to persistence throughout history." He contends that we do not have to begin all over again every time we run into a troubled stretch of social life.

Science News Letter, August 27, 1938

Physics—Philosophy

THE SERIAL UNIVERSE—J. W. Dunne—*Macmillan,* 240 p., $2. The core of the argument put forth by the author, a British aeronautical engineer, is that time is an infinite regress, that this concept solves the chief puzzles of modern physics, and that among its inevitable consequences is the assurance of personal immortality.

Science News Letter, August 27, 1938

Radio

HOW TO WRITE FOR RADIO—James Whipple—*Whittlesey House,* 425 p., $3.50. For those who wish to know how the technique of radio writing differs from the stage, the movies, or the lecture platform, this is the book. It is recommended to those in the field of science who have the opportunity of going on the air.

Science News Letter, August 27, 1938

Mathematics

ADVANCED ANALYTIC GEOMETRY—Alan D. Campbell—*Wiley,* 310 p., $4. This book is designed to follow a first course in plain analytic geometry but it contains material for a more advanced course also. The aim is to introduce the students to the analytic side of projective geometry. Many illustrated problems worked out in the text are included.

Science News Letter, August 27, 1938

Forestry

THE FOREST PRODUCTS LABORATORY—Forest Service, U. S. D. A.—*Govt. Print. Off.,* 33 p., 15 c. A brief account of the many activities of the great laboratory at Madison, Wis., ranging from 300-foot timber-built radio towers to microscopic studies of fibers in paper pulp. Well illustrated.

Science News Letter, August 27, 1938

Medicine

RADIUM LOST AND FOUND—Robert Burbidge Taft—*published by author,* 77 p., $2. See p. 142.

Science News Letter, August 27, 1938